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BIOLOGICAL EVALUATION
Western Spruce Budworm

National Forest, National Park,
Indian Reservation, State, and Private Lands
Region 3

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Forest Insect and Disease Management
State and Private Forestry
Southwestern Region, Forest Service, USDA
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INTRODUCTION

The western spruce budworm caused light defoliation in Region 3 in 1975. However, egg mass surveys conducted in August indicated that budworm populations would increase. Moderate defoliation of Douglas-fir and true firs is expected in 1976 in most areas.

TECHNICAL INFORMATION

Insect.--Western spruce budworm, Choristoneura occidentalis Freeman

Hosts.--Douglas-fir, Pseudotsuga menziesii (Mirb.) Franco
White fir, Abies concolor (Gord. & Glend.) Lindl.
Subalpine fir, Abies lasiocarpa (Hook.) Nutt.
Blue spruce, Picea pungens Engelm.
Engelmann spruce, Picea engelmannii Parry

Location.--The following entomological units and subunits were sampled in 1975 (Fig. 1):

Carriza Unit (Central Division of Lincoln NF)

Carriza I, Carriza II, Board Canyon, and Lick Ridge

Cimarron Unit (State and private lands east of Carson NF, including Philmont Scout Ranch)

Sawmill Canyon, Ute Park Pass, South Urraca I, and South Urraca II

Cuba Unit (Cuba RD, Santa Fe NF)

Senorita Canyon, Blue Bird Mesa I, Blue Bird Mesa II, and Rio Vacas

Kaibab Unit (North Rim of Grand Canyon NP and Northern Division of Kaibab NF)

Murray Lake, East Lake, Log Road, Saddle Mountain, Dog Point, Tortrix, and North Rim

Manzano Unit (Manzano Mountains, Cibola NF)

Turrieta Canyon, Capilla Peak, New Canyon, and Red Canyon

Questa Unit (Questa RD, Carson NF)

Upper Rio Hondo, Middle Rio Hondo, San Cristobal, and Pioneer Creek

Taos Unit (Taos RD, Carson NF)

Upper Capulin, Lower Capulin, Mondragon Canyon, and Garcia Peak

Sandia Unit (Sandia Mountains, Cibola NF)

Balsam Glade, Dry Camp, Tree Spring, and Sulphur Canyon

Type of Damage.--Western spruce budworm larvae damaged host trees by feeding on new foliage. Young larvae feed within expanding buds and flowers in the spring and mature larvae consume needles. Shoots are webbed together by the larvae when they feed. By July, the webbed shoots become reddish brown, and they eventually fall off the tree. Severe defoliation for 4 to 5 years causes trees to die, usually from the top downward.

Extent of Damage.--Budworm defoliation was detected during aerial detection surveys in all the entomological units, except Cimarron and Questa, probably because it was too light and scattered in these units. Visible defoliation was detected on about 9,900 acres: 6,770, light; 2,381, medium; and 702, heavy.

METHODS

Region 3 was divided into entomological units, based on geographical location of mixed conifer forests and administrative responsibilities (Fig. 1). Each unit was divided further into subunits, depending upon where budworm infestations were found during the aerial detection surveys in 1975 or during the egg mass survey the previous year. The sampling procedure developed by McKnight et al.1/ was used to evaluate the infestation for each unit.

At least 50 Douglas-fir branches were collected for examination in each unit, except Carriza. The foliage from all branches were examined for damaged buds to determine current defoliation and new egg masses to predict 1976 defoliation.

The infestation trend for each entomological unit was determined by comparing last year's infestation class with that for the current year.

1/ McKnight, M. E., J. F. Chansler, D. B. Cahill, and H. W. Flake, Jr. 1970. Sequential plan for western budworm egg mass surveys in the central and southern Rocky Mountains. USDA Forest Serv. Res. Note RM-174. 8 p.

RESULTS AND DISCUSSION

Data from the survey of each entomological unit are presented in Table 1. Western spruce budworm populations caused light defoliation in Region 3 during 1975, but egg mass survey data indicate increasing infestation trends in all entomological units, except Carriza and Questa. Moderate defoliation is predicted for 1976 in all units with increasing infestations.

Budworm infestations have been at a low level since late 1960's. Although populations are increasing, tree damage, in the form of top-kill and mortality, has been minimal. However, some growth loss probably has occurred. Several years of moderate to severe defoliation are required to cause permanent tree damage. The present infestations have not reached this level as yet.

No control is recommended for 1976, since only minimal tree damage has occurred to date.

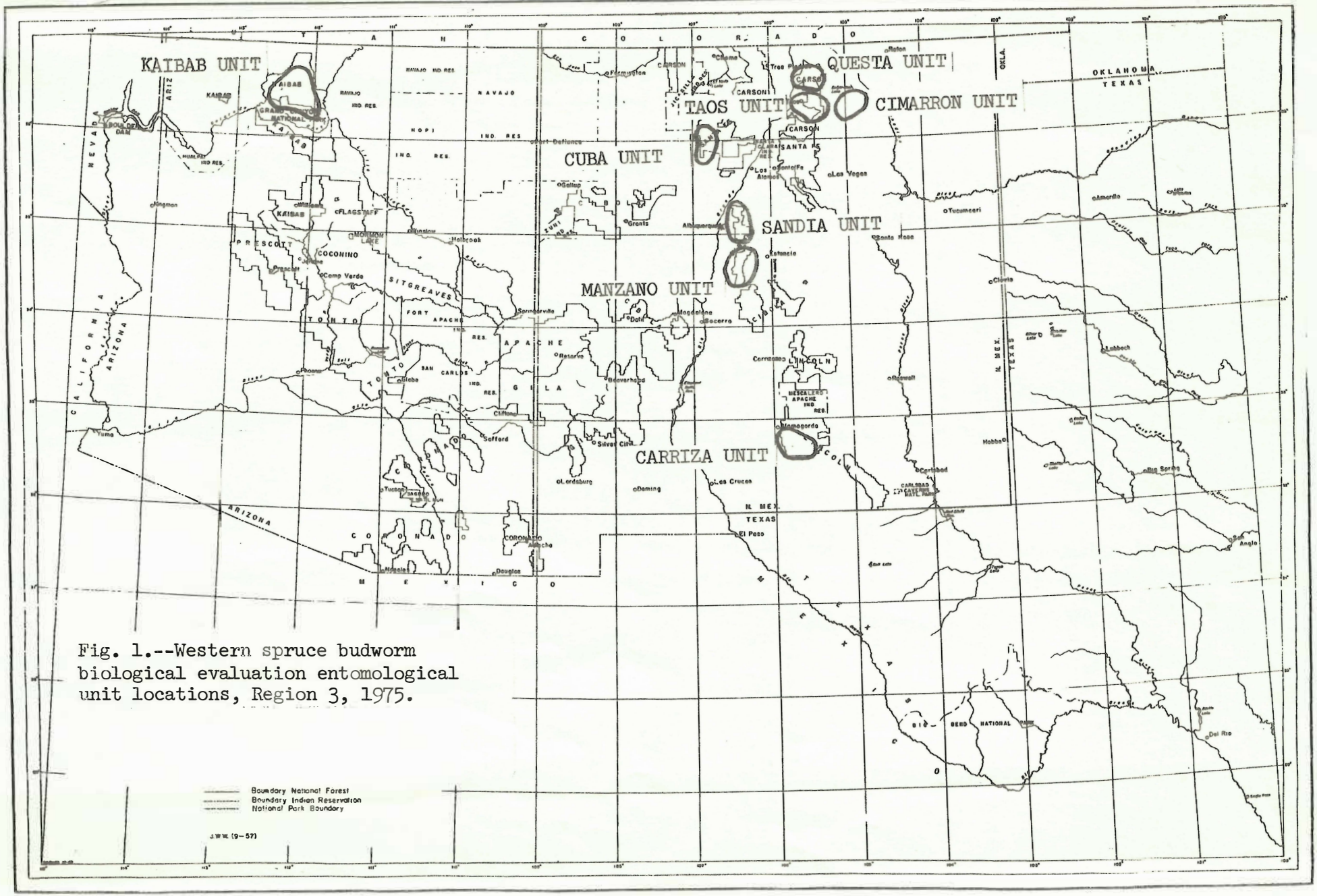

Fig. 1.--Western spruce budworm biological evaluation entomological unit locations, Region 3, 1975.

Table 1.--Summary of western spruce budworm infestations on Douglas-fir, Region 3, 1975.

Entomological unit	Total acres of host type	Aerial estimate of acres infested[a/]	No. of branches sampled	1975 defoliation	1975[b/] new egg masses	1976 predicted defoliation	Infestation trend
Carriza	150,000	L = 3760 M = 1600 H = 560	36	Undetectable	6	Undetectable	Static
Cimarron	31,000	None visible	64	Light	86	Moderate	Increasing
Cuba	200,000	L = 852 M = 355	58	Light	157	Moderate	Increasing
Kaibab	100,000	L = 213 M = 426 H = 142	70	Light	93	Moderate	Increasing
Manzano	20,000	L = 1065	64	Undetectable	133	Moderate	Increasing
Questa	75,000	None visible	60	Undetectable	30	Undetectable	Static
Taos	75,000	L = 520	60	Light	120	Moderate	Increasing
Sandia	10,500	L = 360	64	Light	146	Moderate	Increasing

a/ L = light; M = medium; H = heavy.
b/ Per 1,000 square inches of foliage.